



# Balancing Robot from Recycled Materials

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## TOOLS:

- [Compass \(1\)](#)
- [Craft knife \(1\)](#)  
*or scalpel*
- [Hacksaw \(1\)](#)
- [Hot glue gun \(1\)](#)
- [Marker \(1\)](#)
- [Pliers \(1\)](#)
- [Scissors \(1\)](#)
- [Wire cutters \(1\)](#)



## PARTS:

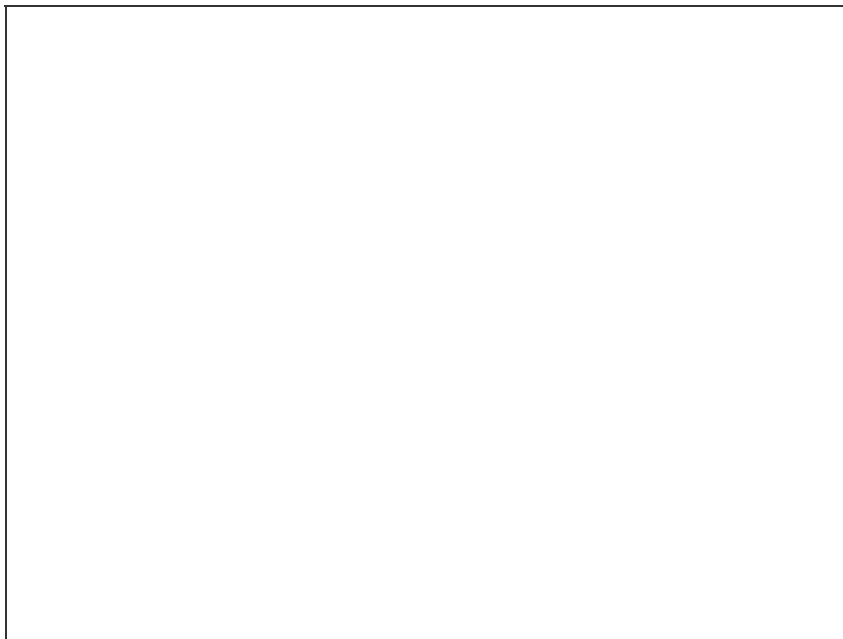
- [Toilet paper tube \(2\)](#)
- [Cardstock \(1\)](#)
- [Wire \(1\)](#)  
*or wire hanger*
- [AA Battery \(1\)](#)
- [Plastic lid \(1\)](#)  
*I used the lid from a can of Gillette Shaving Gel here. Your lid should fit neatly over the end the toilet paper tube.*
- [Roll-on deodorant bottle \(1\)](#)  
*It should fit neatly inside the toilet paper tube.*
- [Spray paint \(1\)](#)

## SUMMARY

Amaze your kids by transforming two old toilet rolls and a few other recycled bits and bobs into a cool steampunk-inspired robot. Amaze them even further by balancing your robot on the edge of a ruler, table, shelf, or even your finger. And then triple amaze them by rotating the arms and revealing the steel heart in the body of the robot.

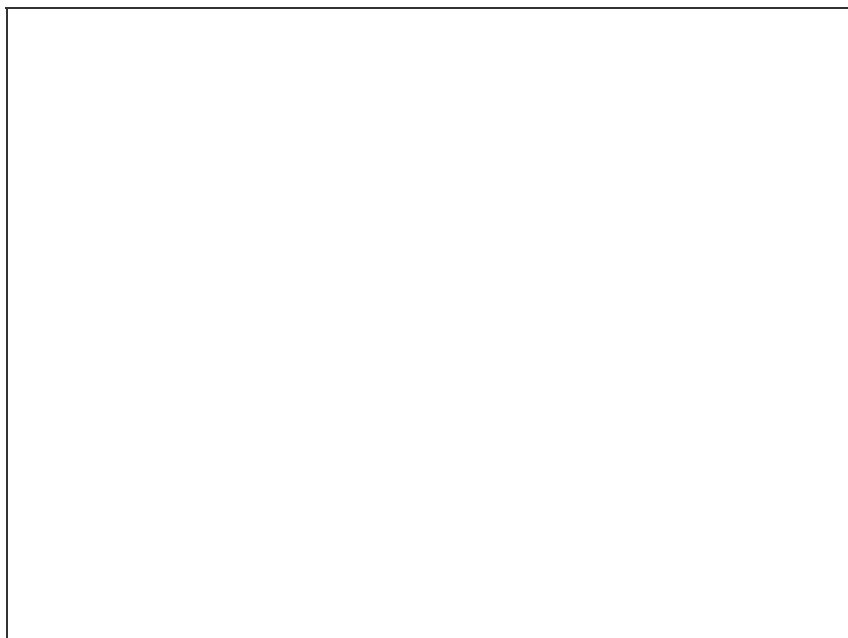
This is a fun summer project that's also an excellent way for your kids to improve their understanding of gravity and mechanics. It's also a very flexible project - while I gave my robot all the bells and whistles (literally, there's a whistle on its head), you can easily customize your robot to suit the materials you have available.

### Step 1 — Balancing Robot from Recycled Materials



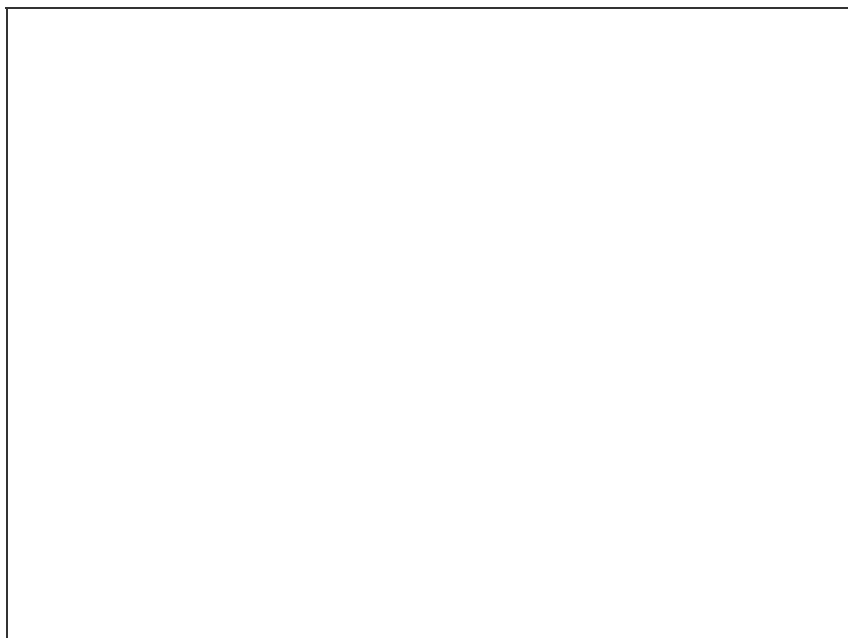
- Step 1: Take a toilet roll tube and use a compass to draw a circle on one side. Make this circle slightly smaller than the diameter of the tube. Now draw another circle on the opposite side (it can be a bit tricky trying to judge the correct position; just try and be as accurate as you can). Finally, draw a small rectangle between the two circles. This will become the hole that reveals the robot's steel heart. Once you've done that, take a craft knife or scalpel and carefully cut out the two circles and the small rectangle. You have now just completed the most tricky step.

## Step 2



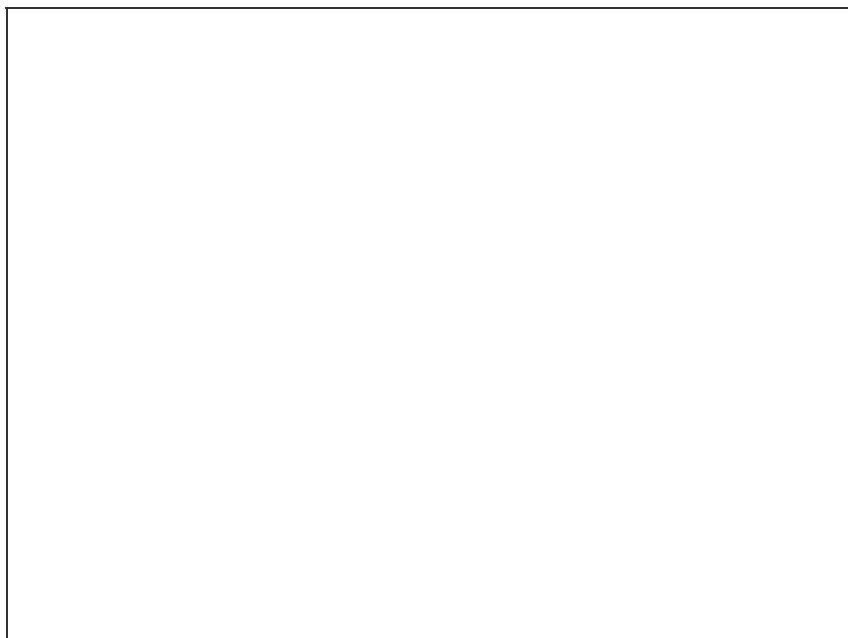
- Step 2: Take the second toilet roll and cut along the length of one side (use a pencil and ruler to ensure it is straight). Squeeze the tube slightly, so the edges overlap, and then slide it through the holes of the first tube. Use a pencil to mark where the edges overlap. Pull the tube back out, and then cut off the overlap using a ruler and craft knife. Rejoin the two edges by gluing a strip of card stock over the join along the inside of the tube. Now, shorten the length of this tube. It needs to be about 1" (25mm) longer than the width of the first tube.

### Step 3



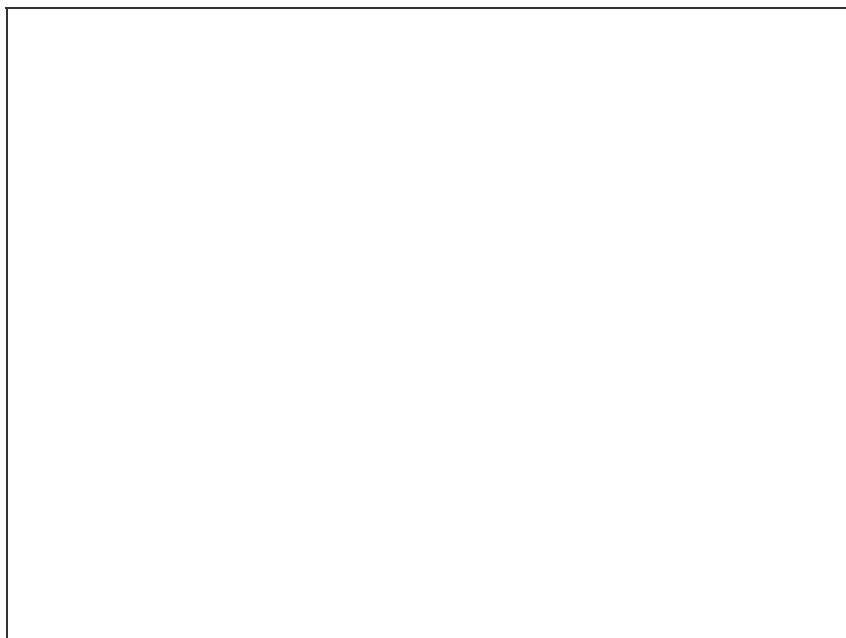
- Step 3: To make the steel heart for your robot, cut a strip of paper twice as long as the rectangular hole in the vertical tube, and a bit wider. Take a black permanent marker and draw the outline of a heart (and some pipes) onto the paper, as shown here. Then color in with a silver metallic pen. Alternatively, you can spray the paper silver first and then use the black permanent marker to create the outlines. I'd also suggest making the spaces around the pipes and heart black. Once you've finished, glue the paper onto the centre of the horizontal tube and insert it back into the robot's body.

## Step 4



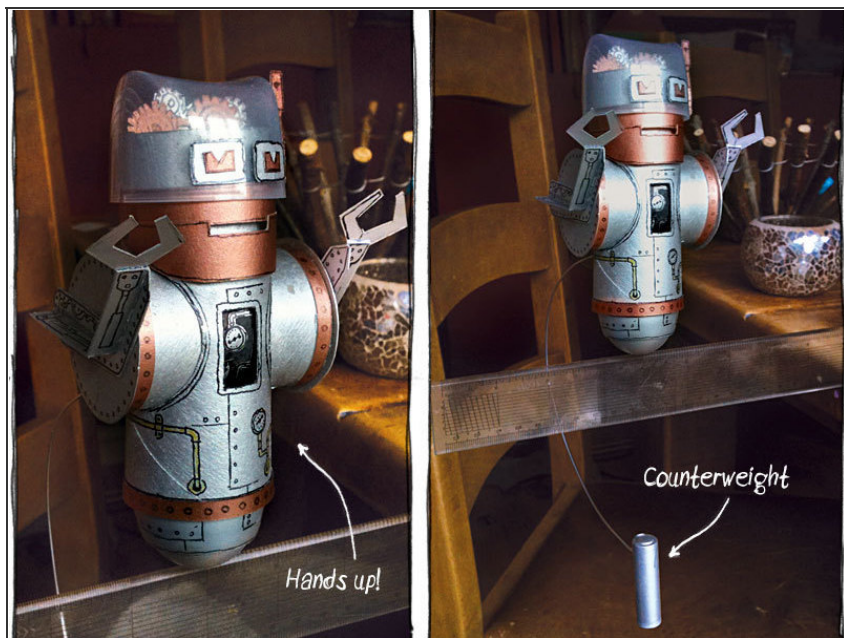
- Step 4: Now spray some light-medium cardstock with metallic bronze spray paint. Cut three thin strips and glue them around the ends of the horizontal tube and the base of the vertical tube. To create the brain, cut a strip of silver cardstock (a bit wider than the vertical tube) and fold the ends over to create small tabs. Now cut different sized cogs from the silver and bronze cards and glue them onto this strip. Lastly, apply glue to the tabs and secure the brain into the top of the vertical tube. To create the robot's jaw, cut two rectangular pieces of cardstock and glue them together.

## Step 5



- Step 5: Push the lid (with the eyes facing forward) on top of the vertical tube. Use some hot glue to attach the lid to the back to the robot. To make the counterbalance, take some thick wire (I used 1.5mm galvanised wire bought from a hardware store, but an old wire coat hanger would work as well) and cut a piece around 18" (450mm) long using pliers or wire cutters. Curve it into a semi-circle and bend the ends at right angles using pliers. Make a hole at the back of the robot and feed the wire through. Use hot glue to attach the bent end to the opposite side of the tube.
- Hot-glue an AA battery to the bottom end of the wire to act as a counterweight.

## Step 6



- Step 6: Now for the finishing touches. Take the black marker pen and add further outlines to your robot - you can follow the photographs above. I added rivets, pipes, pressure valves, and simple outlines to give it the full steampunk look. Oh... I almost forgot - I also created a steam whistle from a piece of the bronze cardstock and glued it onto the side of the robot's head.
- Step 7: The last step is to adjust the wire so that the robot stands upright. This can be quite fiddly; the best way is to balance the robot on the edge of a table and gently bend the wire until your robot stands tall and straight.

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